Recruiting and training the next generation of national security scientists and engineers

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To help develop a future workforce, Los Alamos National Laboratory's National Security Education Center maintains six centers and institutes that host summer schools, seminars, conferences and multidisciplinary research activities.

One of the institutes, the Engineering Institute, focuses on conducting mission-driven, multidisciplinary engineering research and recruiting, with one of the major research thrusts aimed at "structural health monitoring"—the detection of damage in structures or mechanical systems brought about by inevitable aging and degradation or because of extreme events. The Engineering Institute is considered one of the structural health monitoring leaders in the world.

Educational emphasis

The Engineering Institute's educational focus is one of the aspects that research-and-development engineer Eric Flynn particularly enjoys about his work.

Originally from Phoenix, Arizona, Flynn first came to Los Alamos to participate in the Engineering Institute's Dynamics Summer School as an undergraduate college student but nowadays guides and mentors current Engineering Institute participants as a staff member.

"I almost went to school to become an attorney," Flynn said, "but my high school physics teacher, Mr. Dillon, got me excited about a career in science and engineering, and I love sharing the excitement."

In the first nine months of 2015 alone, the Engineering Institute hosted 33 students through the Dynamics Summer School and the Science of Signatures Advanced Scholars Program, and the institute also hired seven graduate students, seven undergraduate students and four high school students for specific research projects.

Alexandria Marchi, a biomedical engineer from Albuquerque, and Kendra Van Buren, a civil and environmental engineer from Cupertino, California, are two of the Engineering Institute's postdoctoral research associates with whom Flynn works.

Marchi

Alexandria Marchi first joined the Laboratory in 2005 while studying chemical engineering at the New Mexico Institute of Mining and Technology (New Mexico Tech), but she has deep family roots in Los Alamos. Her great-grandfather was the chef at Fuller Lodge for nearly two decades beginning in 1943, and her grandparents worked for the Laboratory for many years.

"My uncle Frank was born in Los Alamos and shows 'P.O. Box 1663'—the Lab's secret address at the time—on his birth certificate," Marchi said.

Today, Marchi's work at Los Alamos includes helping to develop a remotely readable tamper-evident seal, a device that recognizes unauthorized access to protected areas or items. The seal has potential for international nuclear nonproliferation applications and commercial use.

"The Laboratory's Engineering Institute provides participants with what I call 'high-impact experiences' by allowing even undergraduates to do hands-on work that means something in the real world," Marchi noted. "Instead of passively sitting in classes or doing 'canned' experiments like every student before and after, you are able to get a sense of ownership and shape your own path."

Marchi recently won a fellowship through Los Alamos' Seaborg Institute, which fosters cooperation and collaboration in actinide science—one of the main branches of nuclear chemistry—among the national laboratories, university campuses and the national and international science community.

Van Buren

Kendra Van Buren also feels that she has science and engineering in her blood.

"My mom was one of the first women engineers working at Intel in 1972," Van Buren said. "Before then, she was the only female to graduate in her engineering class of 125

students. My dad always liked to joke that he had dated all of the women in my mom's engineering program."

Van Buren first arrived at the Laboratory in the summer of 2010 while working on her PhD. Her work on intelligent wind turbines was so rewarding that she decided to return for additional research experience after earning her degree.

Van Buren currently works on projects funded by the Laboratory's Global Security Division and also partners with the Lab's Statistical Sciences group.

"Los Alamos is great at giving postdocs and younger research participants the tools they need to explore their interests instead of telling them what to do," Van Buren explained. "Of course I also love New Mexico for its beautiful scenery and wide range of outdoor activities. I get to run at Ghost Ranch, hike in the mountains and watch the aspens change color in the fall."

To learn more about the National Science Education Center's programs and educational opportunities, check the National Security Education Center and Engineering Institute websites.

For more great science and technology stories from Los Alamos National Laboratory, check out our 1663 publication, which highlights the Laboratory's most significant research initiatives and scientific accomplishments.

You also might enjoy the Laboratory's Picture of the Week series, which offers compelling weekly images that reflect the institution's multi-disciplinary scientific and technological capabilities.

Community Connections features news and opportunities that grow out of the Laboratory's Good Neighbor Pledge: "To partner with our neighbors on strengthening math and science learning, diversifying the economy and expanding community giving in northern New Mexico."